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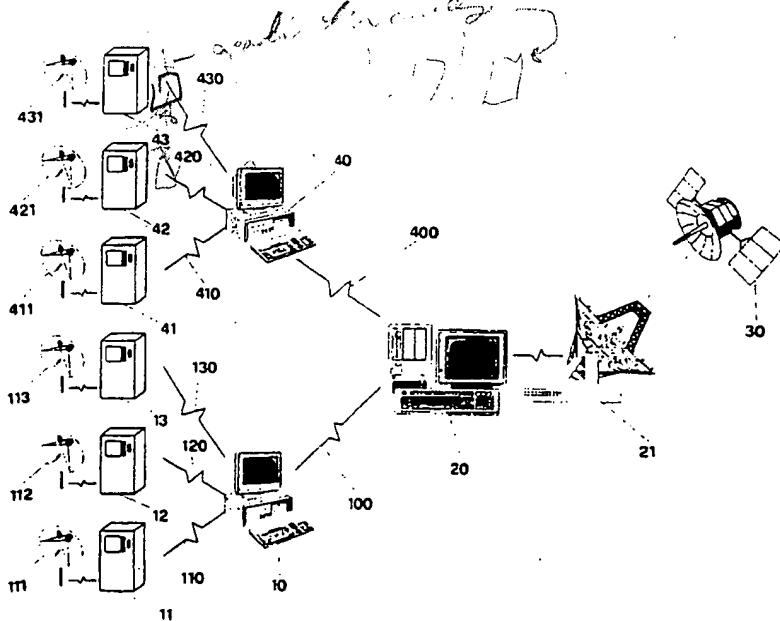
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(54) Title: DISTRIBUTION NETWORK SYSTEM FOR PRODUCTS AND INFORMATION



(57) Abstract

The invention is a distribution network system of automatic dispensers of products and information (11, 12, 13; 41, 42, 43) interconnected with one another and with at least a host computer (10, 40), where homogeneous groups of dispensers are suitable for exchanging information, by means of said host computer, with each dispenser connected with it and with the network node (20) that is connected with each host computer by means of telephone lines and is provided with a transceiver section suitable for getting through to each dispenser by radio, through an antenna (25) or a communication satellite (30).

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1 DISTRIBUTION NETWORK SYSTEM FOR PRODUCTS AND INFORMATION

2 The invention concerns a distribution network system of
3 dispensers of products and services, more particularly a
4 network of dispensers interconnected with each other
5 through a telematic connection accomplished by means of a
6 telephone or radio line and of a communication satellite
7 system or by radio.

8 Automatic dispensers of products are known which are opera-
9 ted by the user by means of coins or credit cards or elec-
10 tronic cards.

11 One of the most widespread automatic dispenser is for
12 distributing banknotes.

13 This machine is stocked with banknotes to be dispensed; the
14 machine is provided with an electronic device that is able
15 to read the magnetic card inserted by the user and to
16 communicate with the master computer that checks the elec-
17 tronic card inserted.

18 After checking, the machine enables the user to require a
19 sum varying within a minimum and a maximum fixed in advan-
20 ce. Once the user has chosen, a device counting the bankno-
21 tes starts working and subsequently a dispenser conveys the
22 selected amount of money to the outlet of the machine.

23 Other types of less complex machines are conceived so that
24 by inserting an electronic card or coins a certain product
25 can be selected. The product is chosen by means of a key-
26 board and is then distributed through a special drawer. One
27 of these machines is the coffee machine or the confectione-
28 ry dispenser.

29 In the case of all these types of machines, if they don't
30 have the required product available, they cannot comply
31 with the user's request and neither can they inform the
32 user about the nearest machine that can satisfy such a
33 request.

34 The aim of the invention is to go beyond the limits of the
35 automatic dispensers that have been described above.

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1 One of the purposes to be achieved is the implementation of
2 an interconnected distribution network of automatic dispens-
3 ers, so that if the product the user wants to get from a
4 certain dispenser isn't available there, the user can be
5 informed about the location of the nearest automatic di-
6 spenser where the required product is available.
7 Another aim to be achieved is the possibility of distribu-
8 ting different products, even of different sizes and belong-
9 ing to different marketing categories, by means of the
10 automatic dispenser that is the object of the invention.
11 Another purpose to be achieved is to carry out an intercon-
12 nection among automatic dispensers so that every automatic
13 dispenser can inform the user about the possibility of
14 finding the required products that are not available where
15 they have been requested and can also give other kinds of
16 information, both by asking the main storage of the compu-
17 ter that controls the interconnected distribution network
18 and by means of the linkage with Data Banks, a linkage that
19 is accomplished on-line by the user and is payed for by
20 directly debiting a credit card or by using a prepaid card.
21 Another aim to be achieved is to enable the manager of the
22 interconnected network to bring up to date the stock of
23 each product in each automatic dispenser on real-time and
24 also to update the prices of the products, when necessary.
25 A further aim is to implement the automatic dispenser
26 belonging to the network so that it can also take back the
27 articles hired by the user, such as videocassettes, CD or
28 other things, and at the same time carry out the necessary
29 accounting operations like the cancellation of the item
30 from the user's stock and the record in the stock of the
31 dispenser.
32 All these aims and others that will be better explained
33 later have been achieved by means of an interconnected
34 distribution network system of automatic dispensers of
35 products and information, which, according to the inven-

1 tion, is characterized in that it includes:

2 A) a plurality of automatic dispensers, each of which

3 includes:

4 -organized spaces suitable for containing the products to

5 be dispensed;

6 -means for taking a selected product and conveying it out

7 of the store;

8 -a system for the positioning of said means;

9 -tools fixed to the conveying means, suitable for taking

10 hold of the selected product and for releasing it;

11 -reading means for the identification of the selected

12 product;

13 -primary storage systems for storing and processing the

14 information regarding the stored items;

15 -secondary storage systems for managing the information

16 received from the user or from the network with which the

17 dispenser is connected;

18 -means for the identification of magnetic cards or semicon-

19 ductor cards;

20 -means for dispensing the selected product to the user;

21 -means for connecting each dispenser with one or more

22 dispensers of the network and each dispenser with a commu-

23 nication satellite by cable and/or by ether;

24 -means for displaying information;

25 -means for printing the required information, if necessary;

26 B) at least a host computer connecting a group of automatic

27 dispensers, each of which is connected with a network node

28 through telephone lines or by radio or by satellite; said

29 computer being suitable for exchanging information with

30 each dispenser that is connected with it and with the

31 network node, said host computer being provided with its

32 own storage and with means right for managing its own Data

33 Banks;

34 C) a network node connected with each of said host compu-

35 ters by means of telephone lines or by radio and provided

1 with a transceiver section suitable for getting through to
2 each dispenser by radio, through an antenna or a communica-
3 tion satellite;

4 D) a communication satellite that receives data from the
5 network node and is in connection with each dispenser.

6 According to the invention, each automatic dispenser is
7 connected, preferably through telephone linkage, with a
8 host computer that examines the requests coming from each
9 dispenser when the latter is not able to comply with re-
10 quests of products that are not available or when the user
11 asks for information instead of products.

12 Once the host computer has received the piece of informa-
13 tion from the automatic dispenser, it gets through to the
14 network node by means of the telephone line and the network
15 node transmits the whole information to a communication
16 satellite. In turn the satellite transmits the information
17 to each automatic dispenser of the network, which receives
18 it by radio through a parabolic antenna. Once the informa-
19 tion has been examined, the answer is released from the
20 automatic dispensers the other way round, namely from the
21 host computer connected with the dispensers to the node,
22 then again to the satellite which transmits the information
23 to the dispenser that has asked the question.

24 Owing to the interconnection among the individual dispen-
25 sers and also to the fact that each dispenser can be con-
26 nected with external networks by means of the communication
27 satellite, it is obvious that each dispenser can work as a
28 terminal for the on-line linkage with Data Banks.

29 Consequently, the user will be allowed to require informa-
30 tion which will first be dealt with by the host computer
31 and then transmitted by the node to a host computer exte-
32 rior to the network through the satellite, a host computer
33 that will be able to supply the required information, for
34 example concerning market quotations, foreign currencies,
35 etc.

1 According to the invention, each dispenser will also be
2 able to take back the articles hired by the user, since it
3 is conceived so that the means for dispensing and taking
4 the products can operate even inversely, namely they can
5 take up the object placed by the user in a given area,
6 which can also be the dispensing area itself, and put the
7 object in the store of the dispenser again, at the same
8 time loading its electronic memory.

9 Further distinctive features and peculiarities of the
10 invention in question will be better highlighted in the
11 description of an application, chosen among many, of the
12 network and of the method employed to accomplish it,
13 illustrated in the attached table in a schematic way:

14 -Figure 1 shows the interconnection among the automatic
15 dispensers of products and information and the interconnec-
16 ting network;

17 -Figure 2 shows a variant of the interconnection among the
18 dispensers belonging to the network.

19 Request for a product available in the dispenser.

20 With reference to Figure 1 the numbers 11, 12 and 13 repre-
21 sent the automatic dispensers belonging to a first group,
22 referred to as a whole with A, and connected by means of a
23 telephone line, for example with protocol X28, with a host
24 computer, referred to with 10, which is able to process the
25 information transmitted by each of the automatic dispen-
26 sers. Likewise, the automatic dispensers 41, 42 and 43 are
27 connected by means of telephone lines, with protocol X28
28 too, with a host computer 40.

29 Each of the automatic dispensers, which will not be descri-
30 bed in detail since they are substantially made up follo-
31 wing known technology, has in its inside one or more stores
32 consisting in hive-shaped or organized spaces suitable for
33 containing the products to be dispensed. Said spaces can be
34 of different sizes or can be vary in such a way as to hold
35 different products, like, for example, videocassettes, roll

1 films, compact-disks or others. Each automatic dispenser is
2 provided with means for taking each product, which are
3 operated by the choice of the user who, upon acceptance
4 after inserting the identification card, can choose the
5 products to select on a video screen.
6 The choice of the products can be made by the user in
7 different ways, for example by means of a keyboard, of a
8 joy-stick or of a touch-screen.
9 Once the computer inside the automatic dispenser has recei-
10 ved the piece of information concerning the product to be
11 taken, said computer compares it to that existing in its
12 storage and transmits the order concerning the position in
13 which the suitable mean has to be placed in order to take
14 the selected product.
15 This way the mean for taking the product positions itself
16 so as to face the compartment out of which the product has
17 to be taken and by means of clasping items, such as pliers,
18 the product is taken and subsequently conveyed to the
19 outlet of the automatic dispenser. At this point the mean
20 for identifying the selected product and the mean for
21 reading such identification go into operation so as to
22 report that a unit of a certain product has been taken and
23 to cancel the presence of such a product from the store.
24 The operation ends when the product is conveyed into the
25 distribution drawer of the automatic dispenser, upon debi-
26 ting the operation to the user's account by credit card or
27 upon the withdrawal of the same amount from a prepaid card.
28 The operation described above concerns the choice and the
29 taking of a product chosen by the user and available in the
30 automatic dispenser itself. This kind of operation cannot
31 substantially be distinguished from other known operations.
32 The situation changes if the user asks for a product that
33 is not available in the automatic dispenser where the
34 request is made, or if the user asks for information in-
35 stead of products. These two different cases will be dealt

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1 with below.

2 Request for a product not available in the dispenser where
3 the request is made.

4 If the user, who, for example, interacts on the automatic
5 dispenser 11, asks for a product that is not available in
6 said automatic dispenser, the storage and processing sys-
7 tems present in the automatic dispenser 11 transfer the
8 piece of information to the host computer, referred to with
9 10, through the telephone line, referred to with 110, with
10 protocol X28. The information is dealt with and transfer-
11 red, through the telephone line 100 with protocol X25, from
12 the host computer 10 to the network node 20. The means 21
13 for transmission by radio pass the piece of information
14 from the network node 20 to the satellite 30. The satellite
15 30 passes the information on by transmitting it to all the
16 paraboloids, both to those of the users' group A, namely
17 111, 112, 113, and to the paraboloids relevant to the auto-
18 matic dispensers of group B, namely to paraboloid 411 of
19 dispenser 41, paraboloid 421 of dispenser 42 and paraboloid
20 431 of dispenser 43.

21 If one or more automatic dispensers have the required
22 product available, they transfer the information back to
23 the host computer with which they are connected through a
24 telephone line and from each of these computers to the
25 satellite 30, which transmits the piece of information by
26 ether to the dispenser 11, from which the request came.

27 The screen of the automatic dispenser 11 displays the
28 information regarding the availability of the product: for
29 example, it can indicate that the nearest dispenser in
30 which the user can find the required product is in a cer-
31 tain street of the same town or in the nearest town. If the
32 user confirms the booking, the product is booked and the
33 user can go to the dispenser, 12 for example, in order to
34 take what has been reported to be available there.

35 Figure 2 shows a variant of the interconnection network

1 where the network node 20 is equipped with a radio antenna
2 25 that transmits directly to the antennas 101, 102 and 103
3 of the dispensers of the first group and to the antennas
4 141, 142, 143 of the dispensers of the second group. This
5 kind of connection is suitable for interconnecting dispen-
6 sers scattered on a comparatively small geographical area.
7 One of the obvious advantages ensuing from the interconnec-
8 tion accomplished by means of a network of automatic di-
9 spensers contrived according to the invention is the fact
10 that, with particular reference to automatic dispensers
11 located in different places in the same town, it is possi-
12 ble to have a minimum quantity of goods in store and conse-
13 quently to optimize the quantity of products available
14 without increasing storage expenses. Furthermore, it is
15 thus possible to comply with the user's request in the best
16 way.

17 Request for information from the user.

18 The intercommunicating network of automatic dispensers that
19 is the object of the present invention can be used to
20 accomplish the distribution not only of products, but also
21 of information.

22 For example, information regarding data could be available,
23 held in the Data Banks belonging to host computers that are
24 not part of the network.

25 In this case the request made, for example, by the automa-
26 tic dispenser 12 through the telephone channel 120 reaches
27 the host computer 10, which deals with the piece of infor-
28 mation and transmits it to the network node 20 with proto-
29 col X25 through line 100. The host computer 10 is provided
30 with a modem, by means of which it can get in connection
31 with the network node 20 through the telephone line 100;
32 further, through said node it can connect itself with the
33 Data Banks that are interconnected with the network node by
34 means of the communication satellite 30 that communicates
35 with the host computer and the modem.

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1 This way from any automatic dispenser any kind of informa-
2 tion can be required, both belonging to the internal Data
3 Banks of the host computer 10 and to the external Data
4 Banks that are connected by the host computer 10 by modem,
5 as stated above.

6 Naturally, once the information has been delivered, the
7 transaction ends and the user is charged with the service:
8 the charging operation is displayed on the screen of the
9 automatic dispenser 12 or is printed, if the dispenser is
10 provided with a printer.

11 As it is clear from what has been described up to now, the
12 interconnection that takes place by means of a network of
13 automatic dispensers able to exchange information with one
14 another, both within the same subgroup and with other
15 subgroups through the network node and by radio, antenna or
16 satellite, optimizes the distribution of the products and
17 allows the managers of the network to know the whole situa-
18 tion of each dispenser of the network at any moment and
19 therefore to restock the dispensers with the products of
20 which they are short, if necessary.

21 Moreover, the network system that is the object of the
22 invention also allows to direct the user to the nearby
23 dispensers, if the dispenser is short of the required
24 product or it allows the user to book the item he is inter-
25 rested in.

26 Besides, the information is an additional service distribu-
27 ted by the network by means of the interconnection of the
28 automatic dispensers with Data Banks that can be both
29 inside or outside the system.

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1 CLAIMS

2 1) Distribution network system of automatic dispensers
3 of products and information characterized in that it com-
4 prises:

5 A) a plurality of automatic dispensers (11, 12, 13; 41, 42,
6 43), each of which includes:

7 -organized spaces suitable for containing the products to
8 be dispensed;

9 -means for taking a selected product and conveying it out
10 of the store;

11 -a system for the positioning of said means;

12 -tools fixed to the conveying means, suitable for taking
13 hold of the selected product and for releasing it;

14 -reading means for the identification of the selected
15 product;

16 -primary storage systems for storing and processing the
17 information regarding the stored items;

18 -secondary storage systems for managing the information
19 received from the user or from the network with which the
20 dispenser is connected;

21 -means for the identification of magnetic cards or semicon-
22 ductor cards;

23 -means for connecting each dispenser (11, 12, 13; 41, 42,
24 43) and a host computer (10, 40) by cable (110, 120, 130;
25 410, 420, 430):

26 -means for connecting each dispenser (11, 12, 13; 41, 42,
27 43) and a host computer (10, 40) by ether (111, 112, 113;
28 411, 421, 431)

29 -means for displaying information;

30 -means for printing the information required;

31 B) at least a Host computer (10, 40) connecting a plurality
32 (A, B) of automatic dispensers, each of which being connec-
33 ted to a network node (20) by means of telephone (100,
34 200), radio or satellite links, said computer being suita-
35 ble for exchanging information with each of the dispensers

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1 connected with it and with the network node, said host
2 computer being provided with its own storage and with means
3 suitable for managing its own Data Banks;
4 C) a network node (20) connected with each of said host
5 computers (10; 20) by means of telephone lines (100; 200)
6 and provided with a transceiver section suitable for get-
7 ting through to each dispenser by radio.

8 2) Distribution network system according to claim 1,
9 characterized in that the transceiver section of the net-
10 work node is an antenna (25).

11 3) Distribution network system according to claim 1,
12 characterized in that the transceiver section of the net-
13 work node is a communication satellite (30) that receives
14 information from the network node (20) and communicates
15 with each of said dispensers (111, 112, 113; 411, 421,
16 431).

17 4) Method for dispensing the products contained in the
18 automatic dispensers belonging to the distribution network
19 system according to claim 1) characterized in that it
20 comprises the steps as follows:

21 -a step in which the dispenser checks if the user's card is
22 enabled to take products;

23 -a step in which the products that can be selected are
24 displayed on the video screen;

25 -a step in which the user chooses the product he wants;

26 -a step in which the dispenser checks if the product is
27 available and, if so, takes it and delivers it to the user;

28 -a step in which the request is passed from the dispenser
29 to the others connected with the network by means of the
30 host computer through a communication satellite, if the
31 required product is not available in the dispenser;

32 -a step in which the answer concerning the place where the
33 required product is available is displayed and/or printed,
34 said piece of information coming from the satellite (30)
35 connected with the dispenser from which the request came;

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1 -a step in which the cost of the product is debited, if the
2 product has been delivered.

3 5) Method for distributing information services
4 through the network according to claim 1) characterized in
5 that it comprises the steps as follows:

6 -a step in which the dispenser checks if the user's card is
7 enabled to receive information;

8 -a step in which the offered services are displayed on the
9 screen;

10 -a step in which the user chooses the service he is intere-
11 sted in;

12 -a step in which the dispenser is linked by cable to the
13 host computer with which it is connected;

14 -a step in which the request is processed by the host
15 computer and the storage files belonging to said computer
16 are checked;

17 -a step in which the answers coming from the remote host
18 are transmitted by cable from the host computer to the
19 dispenser; said answers are distributed through the satel-
20 lite (30) to the network node (20) and subsequently to the
21 host computer (10) to which the dispenser that has made the
22 question belongs;

23 -a step in which the required piece of information is
24 displayed and printed.

25 6) Method for distributing information services accord-
26 ing to claim 5, characterized in that it comprises a step
27 in which Data Banks that belong to the host computer itself
28 or are external to the network are connected by modem and
29 by communication satellite.

30 7) Method for distributing information services accord-
31 ing to claims 5 or 6, characterized in that it comprises a
32 step in which the service is paid by charging the user's
33 account with the relevant amount.

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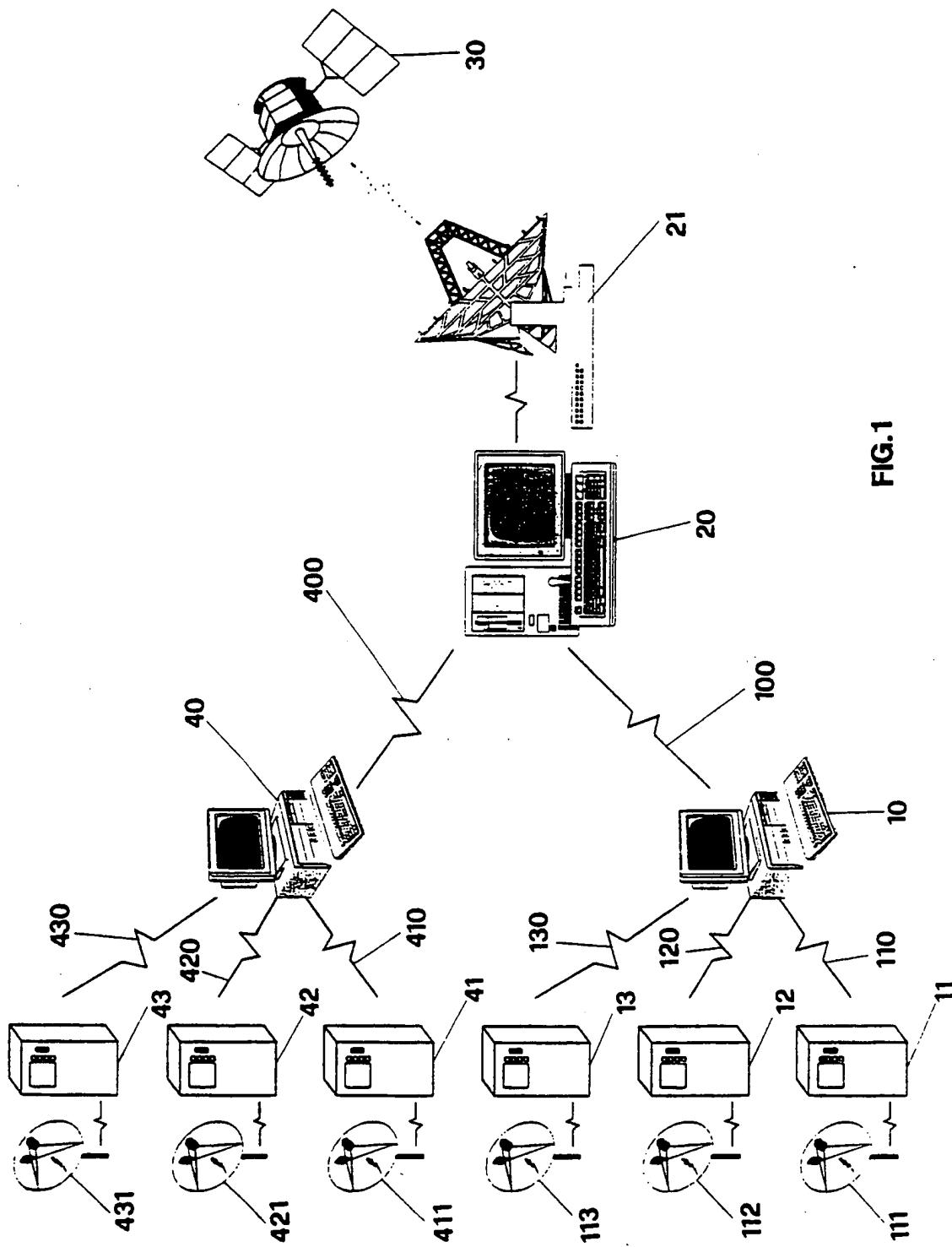
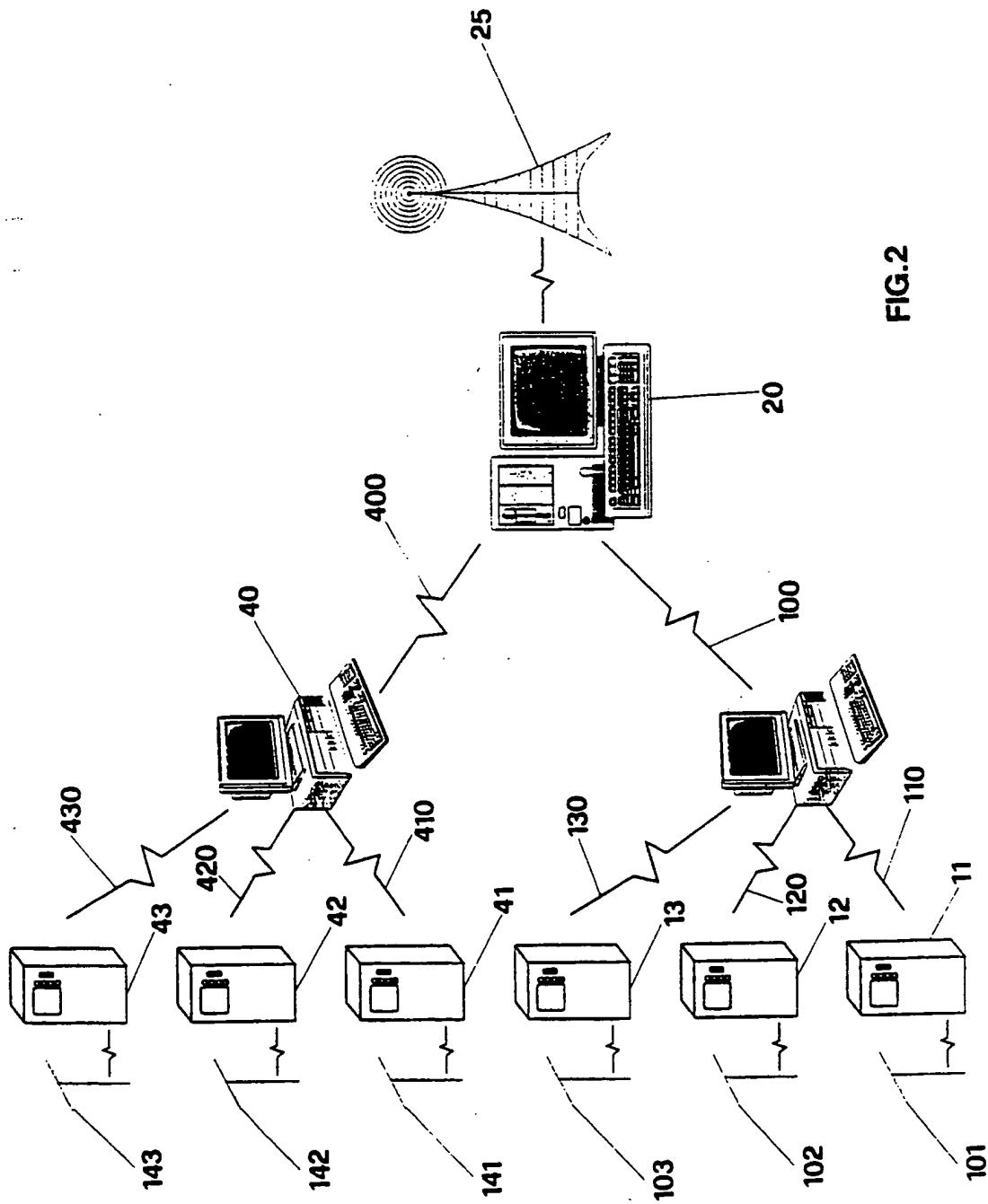


FIG. 1

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INTERNATIONAL SEARCH REPORT

Intern

Application No

PCT/EP 94/02549

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 6 G07F9/02 G07F17/16 G07F7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 6 G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US,A,4 896 024 (H. MORELLO) 23 January 1990 see abstract; figures 1,11-13 see column 4, line 55 - column 8, line 32 see column 12, line 47 - column 13, line 42 see column 18, line 21 - column 19, line 24 ---	1,4
Y	GB,A,2 110 450 (OMRON TATEISI ELECTRONICS) 15 June 1983 see abstract; claims; figures 1-8,12,16-19- ---	1,4
A	EP,A,0 537 756 (FUJITSU) 21 April 1993 see abstract; claims; figures 1-3 see column 1, line 50 - column 8, line 43 ---	1-7 -/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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1

Date of the actual completion of the international search

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30 November 1994

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INTERNATIONAL SEARCH REPORT

Int'l Application No
PCT/EP 94/02549

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US,A,5 091 713 (A.H. HORNE) 25 February 1992 see abstract; claims; figures see column 3, line 10 - column 4, line 20 ---	1,4
A	GB,A,2 254 469 (BARCREST) 7 October 1992 see the whole document ---	1-7
A	US,A,4 803 348 (D.W. LOHREY) 7 February 1989 ---	
A	US,A,4 674 055 (H. OGAKI) 16 June 1987 ---	
A	WO,A,91 20046 (INN-ROOM SYSTEMS) 26 December 1991 -----	
1		

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. Application No

PCT/EP 94/02549

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US-A-4896024	23-01-90	US-A-	4967906	06-11-90
GB-A-2110450	15-06-83	JP-C-	1713634	27-11-92
		JP-B-	3078674	16-12-91
		JP-A-	58087692	25-05-83
		US-A-	4546240	08-10-85
EP-A-0537756	21-04-93	JP-A-	5122145	18-05-93
		JP-A-	5122173	18-05-93
US-A-5091713	25-02-92	NONE		
GB-A-2254469	07-10-92	NONE		
US-A-4803348	07-02-89	JP-A-	1119895	11-05-89
US-A-4674055	16-06-87	JP-A-	59226992	20-12-84
		JP-A-	59226993	20-12-84
		JP-A-	59229673	24-12-84
WO-A-9120046	26-12-91	AU-A-	8050391	07-01-92
		EP-A-	0533800	31-03-93
		US-A-	5339250	16-08-94

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